

PATENT APPLICATION NO. 10/075,728
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AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions and listings of claims in the above-identified application.

Listing of Claims

Claims 1-44 (Canceled)

Claim 45 (Currently Amended) A method ~~as claimed in claim 42, wherein said step (h)~~
~~includes the sub~~comprising the steps of:

- a) generating with a generator electromagnetic radiation including at least one predetermined exposure wavelength that is both significantly absorbed by water and is not significantly absorbed by material composing a structure, and at least one predetermined reference wavelength that is neither significantly absorbed by water nor the material composing the structure;
- b) exposing with the generator a predetermined area of the structure with the generated electromagnetic radiation;
- c) sensing with a sensor unit at least a portion of the generated radiation from the exposed area of the structure to determine a first intensity level of the radiation at the predetermined exposure wavelength, and a second intensity level at the predetermined reference wavelength;
- d) comparing the first and second intensity levels; and
- e) determining that the predetermined area includes water if the first and second levels differ by at least a predetermined amount, and
 - a. testing to confirm that the predetermined area includes water, and if water is confirmed, determining the source of the water detected by
 - i. exposing the a water-confirmed area to second electromagnetic radiation including at least one exposure wavelength that is significantly absorbed by at least one water-soluble substance and that is not significantly absorbed by material composing the structure, and at least one reference wavelength not significantly absorbed by either the water-soluble substance and-or the material composing the structure;

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- ii. sensing the second electromagnetic exposed radiation from the water-confirmed area ~~of the structure~~ at the exposure wavelength absorbed by ~~the water soluble substance~~ to determine a ~~first~~ third intensity level at the exposure wavelength absorbed by ~~the water soluble substance~~, and a ~~second intensity level~~ at the reference wavelength to determine a fourth intensity level;
 - iii. comparing the ~~first~~ third and ~~second~~ fourth intensity levels;
 - iv. determining ~~whether the first and second~~ the source of water to be ground water if the third and fourth intensity levels differ by at least a second predetermined amount; and determining the source of the water to be ground water if the substep (h4) indicates that the first and second levels differ by the predetermined amount or
- f) determining that the predetermined area includes no water if the first and second levels do not differ by at least the predetermined amount or if water is not confirmed by testing.

46. (Currently Amended) ~~A- The method as claimed in of~~ claim 45, wherein the water-soluble substance includes at least one of gypsum, anhydrite, apatite, halite, sylvite, calcite, magnesite, magnesium-iron solid solution, siderite, rhodocrosite, smithsonite, dolomite, and kutnahorite.

47. (Currently Amended) ~~A- The method as claimed in of~~ claim 45, wherein the exposure wavelength includes at least one wavelength of about 6.6, 8.7, 9.6, 11.5, and 14 microns.

48. (Currently Amended) ~~A- The method as claimed in of~~ claim 45, wherein the reference wavelength is in a range from 7.5 to 8.0 microns.

49. (Canceled)

50. (Currently Amended) ~~A- The method as claimed in of~~ claim ~~18~~ 45, wherein the predetermined exposure and reference wavelengths are in a range from about 10^{-2} to about 10^8 microns.

51. (Currently Amended) ~~A- The method as claimed in of~~ claim ~~17~~ 45, wherein the predetermined area is at least one square meter.

52. (Currently Amended) ~~A- The method as claimed in of~~ claim ~~17~~ 45, wherein the structure is a house.

53. (Currently Amended) ~~A- The method as claimed in of~~ claim ~~17~~ 45, wherein the structure

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is a building.

54. (New) The method of claim 45, prior to performance of steps a) – f), further comprising the steps of:

positioning the generator to expose the predetermined area of the structure with the electromagnetic radiation; and

positioning the sensor unit to receive and sense the portion of the generated radiation from the exposed area of the structure.

55. (New) The method of claim 54, wherein the generator and sensor unit are positioned so that the sensor unit receives the portion of the generated radiation from the exposed area of the structure by reflection from the exposed area.

56. (New) The method of claim 54, wherein the generator and sensor unit are positioned so that the sensor unit receives the portion of the generated radiation transmitted through the exposed area of the structure.

57. (New) The method of claim 45, wherein the generator includes a quartz halogen lamp.

58. (New) The method of claim 45, wherein the generator generates radiation with a power of between ten and one-thousand Watts.

59. (New) The method of claim 45, wherein the generator is supported in a fixed position during the performance of step b) with a photographic stand.

60. (New) The method of claim 45, wherein the sensor unit includes a spectrometer.

61. (New) The method of claim 45, wherein the sensor unit includes a spectroradiometer.

62. (New) The method of claim 45, wherein the sensor unit includes a hyperspectral imaging system.

63. (New) The method of claim 45, wherein the predetermined exposure wavelength includes at least one wavelength at about 0.76, 0.97, 1.19, 1.45, 1.94, 2.55, 2.7, 5.5 or 10.7 microns.

64. (New) The method of claim 45, wherein the predetermined reference wavelength includes at least one wavelength at about 1.06 or 1.66 nanometers.